

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A voice communication device, comprising:

a control CPU for outputting a speaker amplification value corresponding to volume on a speaker which is adjusted by a terminal user by using a volume control unit;

an output amplifier;

an echo processing unit for reducing an echo equivalent to output voice, which is obtained by amplifying a received input signal demodulated and voice-decoded according to the speaker amplification value output from the control CPU and outputting the received input signal from the speaker mixed with a transmitting input signal input through a microphone, according to the speaker amplification value, wherein

said echo processing unit includes an adaptive filter[[,]] and echo canceling means for changing a filter coefficient, which is calculated according to an acoustic transmission characteristic between the microphone and the speaker, according to a degree of change of the speaker amplification value, calculating a pseudo echo from both the received input signal and the filter coefficient, and removing an echo from the transmitting input signal including the echo by using the pseudo echo; wherein

said filter coefficient is changed stage by stage by the echo canceling means in a case where the degree of the change of the speaker amplification value is larger than a prescribed degree of change;

said adaptive filter is directly connected to the control CPU, and

said control CPU outputs the speaker amplification value directly to the adaptive filter and the output amplifier.

Claim 2 (Original): A voice communication device according to claim 1, wherein the echo processing unit comprises an echo canceling means calculating a pseudo echo from both the received input signal amplified according to a degree of the change of the speaker amplification value and a filter coefficient calculated according to an acoustic transmission characteristic between the microphone and the speaker, and removing the echo from the transmitting input signal including the echo by using the pseudo echo.

Claim 3-4 (Canceled).

Claim 5 (Currently Amended): A voice communication device according to claim [[3]] 1, wherein the filter coefficient is set to zero or a value near to zero by the echo canceling means in a case where the degree of the change of the speaker amplification value is larger than a prescribed degree of the change.

Claim 6 (Currently Amended): A voice communication device according to claim [[3]] 1, wherein the filter coefficient is changed by the echo canceling means in a case where the degree of the change of the speaker amplification value is larger than a prescribed degree of the change within a prescribed time period.

Claim 7 (Original): A voice communication device according to claim 1, wherein the echo processing unit comprises echo canceling means for calculating a pseudo echo from both the received input signal and the filter coefficient calculated according to an acoustic transmission characteristic between the microphone and the speaker, changing the pseudo echo according to the speaker amplification value, and removing to remove the echo from the transmitting input signal including the echo by using the changed pseudo echo.

Claim 8 (Canceled).

Claim 9 (Original): A voice communication device according to claim 2, wherein the pseudo echo is attenuated by a prescribed value by the echo canceling means in a case where the speaker amplification value is larger than a prescribed threshold value.

Claim 10 (Original): A voice communication device according to claim 2, wherein the pseudo echo, which is calculated according to the filter coefficient calculated before the speaker amplification value becomes larger than a prescribed threshold value, is used by the echo canceling means to remove the echo from the transmitting input signal in a case where the speaker amplification value is larger than the prescribed threshold value.

Claim 11 (Original): A voice communication device according to claim 1, wherein the echo processing unit comprises a double talk detecting means for altering a judgment criterion for double talk detection according to a degree of the change of the speaker amplification value and detecting a double talk according to the altered judgment criterion, and echo canceling means for calculating a pseudo echo from a filter coefficient calculated according to an acoustic transmission characteristic between the microphone and the speaker, removing the echo from the transmitting input signal including the echo by using the pseudo echo, and performing a renewal stop or a renewal start of the filter coefficient according to a detection result of the double talk detecting means.

Claim 12 (Original): A voice communication device according to claim 1, wherein the echo processing unit comprises a double talk detecting means for altering a judgment

criterion for double talk detection according to a degree of the change of the speaker amplification value and detecting a double talk according to the altered judgment criterion, echo canceling means for reducing an echo component of the transmitting input signal by using a pseudo echo and producing a residual signal, and echo suppressing means for suppressing the residual signal produced by the echo canceling means at an attenuation value which changes according to a detection result of the double talk detecting means.

Claim 13 (Canceled).

Claim 14 (Previously Presented): A voice communication device according to claim 1, wherein the echo processing unit comprises echo suppressing means for suppressing the transmitting input signal including the echo at an attenuation value corresponding to the speaker amplification value output from the control CPU.

Claim 15 (Previously Presented): A voice communication device according to claim 1, wherein the echo processing unit is formed of a digital signal processor.

Claim 16 (Currently Amended): An echo processing processor, comprising:

a received signal input port for receiving a received input signal including voice information;

a speaker amplification value input port for receiving a speaker amplification value corresponding to volume which is adjusted by using a volume control unit;

a transmitting signal input port for receiving a transmitting input signal including voice given by a terminal user; and

an echo reduction processing unit for performing an echo reduction process in which an echo equivalent to output voice, which is obtained by amplifying the received input signal received in the received signal input port according to the speaker amplification value received in the speaker amplification value input port and outputting the received input signal from a speaker mixed with the transmitting input signal received in the transmitting signal input port, is reduced according to the speaker amplification value, wherein

said echo processing unit includes an adaptive filtering process, and

said adaptive filtering process receives said speaker amplification value directly from said speaker amplification value input port,

said speaker amplification value input port connects directly to said adaptive filtering process, and an output amplifier,

said echo processing unit including an echo canceling means for changing a filter coefficient, which is calculated according to an acoustic transmission characteristic between transmitting signal input port and the speaker amplification value input port, according to a degree of the change of the speaker amplification value, calculating a pseudo echo from both the received signal input port and the filter coefficient, and removing echo from the transmitting signal input port including the echo by using the pseudo echo; wherein

said filter coefficient is changed stage by stage by the echo canceling means in a case where the degree of the change of the speaker amplification value is larger than a prescribed degree of change.

Claim 17 (Currently Amended): An echo processing processor according to claim 16, wherein an amplification process for amplifying the received input signal received in the received signal input port according to a degree of the change of the speaker amplification value received in the speaker amplification value input port, a filter coefficient calculating

process for calculating the filter coefficient according to an acoustic transmission characteristic between ~~a microphone~~ the transmitting signal input port and the ~~speaker~~ received signal input port, a pseudo echo calculating process for calculating ~~[[a]]~~ the pseudo echo from the filter coefficient calculated in the filter coefficient calculating process and the received input signal amplified in the amplification process and an echo canceling process for removing the echo from the received input signal by using the pseudo echo are performed in the echo reduction processing unit.

Claim 18 (Currently Amended): An echo processing processor according to claim 16, wherein a filter coefficient calculating process for calculating the filter coefficient according to an acoustic transmission characteristic between ~~a microphone~~ the transmitting input signal port and the ~~speaker~~ received signal input port, a pseudo echo calculating process for changing the filter coefficient calculated in the filter coefficient calculating process according to a degree of ~~[[the]]~~ change of the speaker amplification value received in the speaker amplification value input port and calculating ~~[[a]]~~ the pseudo echo from both the filter coefficient and the received input signal received in the received signal input port and an echo canceling process for removing the echo from the received input signal by using the pseudo echo are performed in the echo reduction processing unit.

Claims 19-21 (Canceled).

Claim 22 (Currently Amended): An echo processing processor according to claim 16, wherein a filter coefficient calculating process for calculating the filter coefficient according to an acoustic transmission characteristic between ~~a microphone~~ the transmitting signal input port and the ~~speaker~~ receiving signal input port, a pseudo echo calculating process for

calculating ~~[[a]]~~ the pseudo echo from both the filter coefficient calculated in the filter coefficient calculating process and the received input signal received in the received signal input port and an echo canceling process for changing the pseudo echo calculated in the pseudo echo calculating process according to the speaker amplification value received in the speaker amplification value input port and removing the echo from the received input signal by using the changed pseudo echo are performed in the echo reduction processing unit.

Claim 23 (Canceled).

Claim 24 (Currently Amended): An echo processing processor according to claim 16, wherein a double talk detecting process for altering a judgment criterion for double talk detection according to a degree of ~~[[the]]~~ change of the speaker amplification value and detecting a double talk according to the altered judgment criterion, a filter coefficient calculating process for calculating the filter coefficient according to an acoustic transmission characteristic between ~~a microphone~~ the transmitting signal input port and ~~the speaker receiving signal input port~~ and performing a renewal stop or a renewal start of the filter coefficient according to a double talk judgment result of the double talk detecting process, a pseudo echo calculating process for calculating ~~[[a]]~~ the pseudo echo from both the filter coefficient calculated in the filter coefficient calculating process and the received input signal received in the received signal input port and an echo canceling process for removing the echo from the received input signal by using the pseudo echo are performed in the echo reduction processing unit.

Claim 25 (Currently Amended): An echo processing processor according to claim 16, wherein a double talk detecting process for altering a judgment criterion for double talk

detection according to a degree of [[the]] change of the speaker amplification value and detecting a double talk according to the altered judgment criterion, an echo canceling process for reducing an echo component of the transmitting input signal by using [[a]] the pseudo echo and producing a residual signal and an echo suppressing process for suppressing the residual signal at an attenuation value which changes according to a detection result of the double talk detecting process are performed in the echo reduction processing unit.

Claim 26 (Previously Presented): An echo processing processor according to claim 16, wherein an echo suppressing process for suppressing the transmitting input signal including the echo at an attenuation value corresponding to the speaker amplification value is performed in the echo reduction processing unit.